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By Express Mail # EV052763082US

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(REV 10-94)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

DOCKET #: 4925-180PUS**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING
UNDER 35 U.S.C. 371**U.S. APPLICATION NO.
09/980075
(If known, see 37 CFR 1.52)

INTERNATIONAL APPLICATION NO

PCT/EP99/03875

INTERNATIONAL FILING DATE

04 June 1999

PRIORITY DATE CLAIMED

04 June 1999

TITLE OF INVENTION

Packet Data Transmission Control

APPLICANT(S) FOR DO/EO/US

Martin BERGENWALL

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☒ are transmitted herewith (required only if not transmitted by the International Bureau). (See Reply to Written Opinion)
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). **Unexecuted**
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. Below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter
16. ☒ Other items or information (*specify*) PCT Publication Sheet, Int'l Preliminary Examination Report, Written Opinion, Reply to Written Opinion, Information Concerning Elected Offices Notified of Their Election, Notice Informing the Applicant of the Communication of the International Application to the Designated Offices, Notification of the Recording of a Change, Notification of Receipt of Record Copy

09/980075

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17.[x]The following fees are submitted:

Basic National Fee (37 CFR 1.492(a)(1)-(5)):

Search Report has been prepared by the EPO or JPO \$890.00
 International preliminary examination fee paid to USPTO (37 CFR 1.482).....\$710.00
 No international preliminary examination fee paid to USPTO (37 CFR 1.482)
 but international search fee paid to USPTO (37 CFR 1.445(a)(2)).....\$740.00
 Neither international preliminary examination fee (37 CFR 1.482)
 nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO\$1040.00
 International preliminary examination fee paid to USPTO (37 CFR 1.482)
 and all claims satisfied provisions of PCT Article 33(2)-(4)\$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =

\$ 890

Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months
 from the earliest claimed priority date (37 CFR 1.492(e)).

\$

Claims	Number Filed	Number Extra	Rate		
Total Claims	25 - 20 =	5	x \$18.00	\$	90
Independent Claims	3 - 3 =	0	x \$84.00	\$	
Multiple dependent claim(s) (if applicable)			+ \$280.00	\$	

TOTAL OF ABOVE CALCULATIONS =

\$ 980

Reduction of 1/2 for filing by small entity, if applicable.

\$

SUBTOTAL =

\$ 980

Processing fee of **\$130.00** for furnishing the English translation later than ☐ 20 ☐ 30
 months from the earliest claimed priority date (37 CFR 1.492(f)).

+

\$

TOTAL NATIONAL FEE =

\$ 980

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be
 accompanied by the appropriate cover sheet (37 CFR 3.28, 3.31). **\$40.00** per property

+

\$

TOTAL FEES ENCLOSED \$980

Amount to be refunded:

\$

charged:

\$

- a. ☒ One check in the amount of \$ 980 to cover the above fee is enclosed.
 b. ☐ Please charge my Deposit Account No. 03-2412 in the amount of \$ to cover the above fees. A duplicate copy of
 this sheet is enclosed.
 c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
 overpayment to Deposit Account No. 03-2412. A duplicate copy of this sheet is enclosed.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive
 (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO

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JC10 Rec'd PCT/PTO 2 8 NOV 2001

By Express Mail # EV052763082US · November 28, 2001

Attorney Docket # 4925-180PUS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re National Phase PCT Application of

Martin BERGENWALL et al.

International Appln. No.: PCT/EP99/03875

International Filing Date: 04 June 1999

For: Packet Data Transmission Control

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents

Washington, D.C. 20231

BOX PCT

S I R:

Prior to examination of the above-identified application, amend the application as follows:

In the Specification:

On (amended) page 5, delete the paragraph from line 10 to 12, and insert therefor the following new paragraph:

--In accordance with one aspect of the present invention, a packet data transmission network system comprises a receiver, and a sender for transmitting data packets to the receiver

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through a packet data connection via a network element. The receiver is arranged to acknowledge each received data packet by an acknowledgment message containing header data comprising a window size. The number of transmitted bytes for which the sender has not received an acknowledgement from the receiver does not exceed the window size. The network element is arranged to buffer data packets transmitted by the sender and examine and modify the header data. The network element is also arranged to detect transmission conditions comprising radio conditions and modify the window size accordingly. The present invention is also directed to an associated data transmission method and an appropriate network element.

On page 6, delete the two paragraphs from line 1 to line 7 and insert therefor the following as a new paragraph:

--Other objects and features of the present invention will become apparent from the following detailed description considered in conjunction with the accompanying drawings. It is to be understood, however, that the drawings are intended solely for purposes of illustration and not as a definition of the limits of the invention, for which reference should be made to the appended claims.--

On page 10, line 1, delete "CLAIMS:" and insert therefor --What is claimed is:--.

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In the Claims:

Please amend 3-6, 9 and 10 to read as follows:

3. The system according to claim 1, wherein said network element (3) is arranged to quit modifying the window size when it detects that the quality of transmission conditions is increasing and allow the receiver (1) to set the window size normally.

4. The system according to claim 1, wherein the transmission conditions detected by said network element (3) comprise buffering conditions of data packets at said network element (3).

5. The system according to claim 1, wherein the packet data connection is a TCP/IP connection.

6. The system according to claim 1, wherein said network element (3) is an SGSN network element for performing header compression.

9. The network element according to claim 7, wherein said modifying means is arranged to quit modifying the window size when said detecting means detects that the quality of transmission conditions are increasing.

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10. The network element according to claim 7, wherein the transmission conditions detected by said detecting means comprise buffering conditions of data packets at said buffering means.

Add the following new claims:

12. The system according to claim 2, wherein said network element (3) is arranged to quit modifying the window size when it detects that the quality of transmission conditions is increasing and allow the receiver (1) to set the window size normally.

13. The system according to claim 2, wherein the transmission conditions detected by said network element (3) comprise buffering conditions of data packets at said network element (3).

14. The system according to claim 3, wherein the transmission conditions detected by said network element (3) comprise buffering conditions of data packets at said network element (3).

15. The system according to claim 2, wherein the packet data connection is a TCP/IP connection.

22. The system according to 6, wherein said network element (3) is an SGSN network element for performing header compression.

24. The network element according to claim 8, wherein the transmission conditions detected by said detecting means comprise buffering conditions of data packets at said buffering means.

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REMARKS

This preliminary amendment is presented to place the application in proper form for examination and to eliminate multiple dependency from the present claims. No new matter has been added. Early examination and favorable consideration of the above-identified application is earnestly solicited.

Any additional fees or charges required at this time in connection with the application may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,
COHEN, PONTANI, LIEBERMAN & PAVANE

By: _____



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28 November 2001

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AMENDMENTS TO THE SPECIFICATION AND CLAIMS SHOWING CHANGES

In the Claims:

3. The system according to claim 1 [or 2], wherein said network element (3) is arranged to quit modifying the window size when it detects that the quality of transmission conditions is increasing and allow the receiver (1) to set the window size normally.
4. The system according to claim 1 [any one claims 1 to 3], wherein the transmission conditions detected by said network element (3) comprise buffering conditions of data packets at said network element (3).
5. The system according to claim 1 [any one of claims 1 to 4], wherein the packet data connection is a TCP/IP connection.
6. The system according to claim 1 [any one of claims 1 to 6], wherein said network element (3) is an SGSN network element for performing header compression.
9. The network element according to claim 7 [or 8], wherein said modifying means is arranged to quit modifying the window size when said detecting means detects that the quality of transmission conditions are increasing.

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10. The network element according to claim 7 [any one of claims 7 to 9], wherein the transmission conditions detected by said detecting means comprise buffering conditions of data packets at said buffering means.

TITLE OF THE INVENTIONPacket data transmission control.5 FIELD OF THE INVENTION

The present invention relates to a packet data transmission network system and method and a network element such as an SGSN (Serving GPRS Support Node) network element for setting
10 a window size in a system like GPRS/3G (General Packet Radio Service/Third Generation).

BACKGROUND OF THE INVENTION

15 In a network system in which a receiver like a mobile terminal has a packet data connection such as TCP/IP (Transport Control Protocol/Internet Protocol) to a sender like a service provider, a windowing mechanism is used to make transmitting operations more efficient. In a
20 transmitting operation, the service provider sends TCP/IP data packets to the mobile terminal and the mobile terminal acknowledges the receipt of the packets via acknowledgment messages. The windowing mechanism allows the sender to send several packets before receiving an acknowledgment.

25 The maximum window size is specified in each acknowledgment message as the number of bytes the receiver, i.e. the mobile terminal, is still able to receive. For this purpose, the TCP header contains a field in which the maximum window size is
30 determined. The sender, i.e. the service provider, is not allowed to exceed the maximum window size and may only send packets up to this limit.

In systems with a radio part such as GSM/GPRS (Global System
35 for Mobile communications/ General Packet Radio Service) and UMTS (Universal Mobile Telecommunications System) the

transmission rate can vary because of bad radio conditions. The rate decreases when the mobile system specific error correcting protocol such as LLC (Logical Link Control) has to interrupt the normal transmission and perform
5 retransmissions. Also other factors like the available radio capacity may decrease the rate for most effective packet transmission.

When the transmission rate decreases for a TCP/IP packet data
10 connection the downlink IP packets (the packets sent by the service provider) have to be buffered. In GPRS the buffering takes place in an SGSN network element. If the rate decreases for a long time, TCP retransmission timers for the buffered packets might expire since they cannot be acknowledged. In
15 addition, there might be not enough buffering space in the SGSN network element so that some packets have to be discarded. Therefore, an adverse change in radio conditions and/or buffering space results in transmission inefficiency and unnecessary retransmissions over the TCP connection
20 because the sender is not aware of the changed conditions.

Thus, the sender has somehow to be informed that the ability of the mobile terminal to receive packets has temporarily decreased and IP packets should not be sent as fast as
25 before. This must be effected with standardized methods since it cannot be required for the sender to know any mobile system specific means.

In normal operation, TCP/IP makes use of slow start and
30 congestion avoidance algorithms to deal with errors. Hence, the window size is dropped when a time-out occurs and is then slowly increased. The sender then waits for an acknowledgment message of a TCP/IP packet from the receiver. Because the packet is buffered or discarded in the SGSN network element a
35 timer in the sender expires and slow start and congestion avoidance are applied in combination with retransmission of

the unacknowledged data packets. Thus, the sender sends only one packet (or a few packets) before it receives an acknowledgment message and then increases the window size step by step and sends more before next acknowledgments.

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This also works in cellular packet transmission but a retransmission is required for slow start and congestion avoidance to start. The slow start and congestion avoidance is even slower in again adapting to improved conditions if the decreased conditions were only temporal.

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The IP protocol family includes a protocol called ICMP (Internet Control Message Protocol) which specifies a message called Source Quench to advise the sender that it should slow down the transmission. Later, if no Source Quench messages are received for a while the sender again slowly increases the transmission rate. However, the adaptation speed to the changed conditions is slow. Moreover, some firewalls also filter out the Source Quench message so that the sender does not get the information.

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In the patent application WO96/36150 a digital data transmission system is defined in which the transmitting and receiving parties can change the size of a sliding window when one or both of them receive information from control means that the data transmission capacity of the connection has changed. However, in a case when the transmitting and receiving parties do not even know about any reason to change the window size, no adaptation to changed conditions takes place and unnecessary retransmission may have to be performed.

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Furthermore, a method called Fast Recovery is known that tries to enhance the adaptation speed to better conditions. However, this method still requires at least one retransmission. Moreover, the Fast Recovery is adapted to

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operate with congested routers and not radio conditions so
that it does not work in a very optimal way with cellular
5 packet data because the characteristics of the service
degradation are very different.

By Ziegler T. et al.: 'Congestion Avoidance with BUC Gateways
and RFCN', IEEE International Performance, Computing and
10 Communications Conference, US, New York, IEEE, February 5,
1997, pp. 410-418, a BUC (Buffer Utilization Control)
algorithm is disclosed which is executed in a so called BUC
gateway. Moreover, a signaling mechanism called RFCN (Reverse
Feedback Congestion Notification) is disclosed. RFCN is
15 applicable to transport protocols using sliding window flow
control, e.g. TCP. According to window flow control, the
receiver transmits its available buffersize to the sender in
a window-field in the ACK-header. The BUC algorithm may
update the credit value in this window field to its computed
20 window to control the transmission rate of a data-sender. For
this purpose, each conversation maintains two per-conversation-
queues at two distinct output-ports at the BUC gateway. From
the view of a data-sender one of these per-conversation-
queues is the "forward queue", i.e. the queue storing the
25 packets sent by the data-sender. The other per-conversation-
queue is the "backward queue", the queue storing the ACKs to
be received by the data-sender. The RFCN algorithm requires
that each forward queue has access to the data structures of
its corresponding backward queue and vice versa. If used in
30 combination with RFCN, the BUC algorithm calculates the
window at the forward queue and sets the header field of ACKs
at the corresponding backward queue.

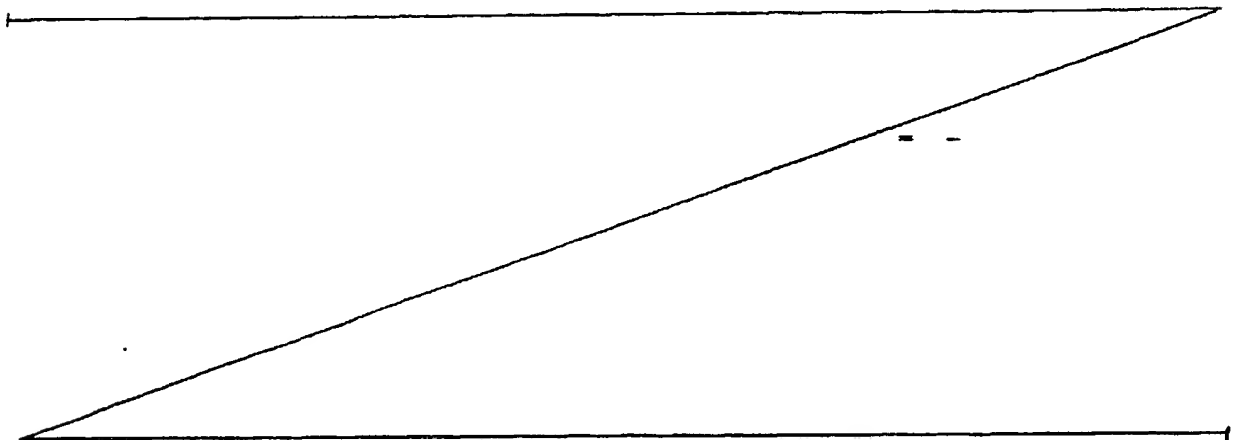
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SUMMARY OF THE INVENTION

- 5 It is an object of the present invention to provide a reliable and fast adaptation of the transmission speed of a sender in a radio communication environment while unnecessary retransmissions are avoided.
- 10 According to the present invention, this object is achieved by a system according to claim 1, a network element according to claim 7 and a method according to claim 11.

According to the present invention, the information about the
15 receiving ability of a receiver can be sent to the sender right away or even in advance, in case decreasing conditions are detected in the mobile system.

Furthermore, according to the present invention, the
20 throughput and efficiency of TCP/IP connections through packet data in GPRS/3G is optimized. The present invention is fully compliant with existing TCP/IP stacks and requires therefore no modification of the involved parties. Only the header compression routine (or a routine logically close to
25 the header compression) in the SGSN network element requires new code.



- In a transmission operation, the service provider 2 sends
35 TCP/IP data packets to the mobile terminal 1 via the GGSN,
the network element 3 and an RAN (Radio Access Network), and

the mobile terminal 1 acknowledges the receipt of the data packets using acknowledgment messages. In order to make the transmission more efficient, in TCP/IP there is used a windowing mechanism. According to this windowing mechanism, 5 each TCP packet contains a field that tells how many bytes the receiver is still able to receive. Thus, the service provider 2 knows how many bytes still can be sent, and it is possible to send the next packet before an acknowledgment message for the previous packet is received. Hence, the 10 window size determines how many new packets can be sent before the acknowledgment for the previous packet is received.

In the following, an example of the operation of the SGSN 15 network element 3 for optimizing the window size will be described with reference to the flowchart in Fig. 2.

The SGSN network element 3 which is aware of radio conditions and its buffering capacity present during a transmission 20 operation monitors the TCP window field in the acknowledgment messages (step S1). When the SGSN network element 3 detects that the radio conditions are getting poorer, i.e. the transmission rate decreases (step S2), the SGSN network element 3 starts changing the window size field of the mobile 25 terminal 1 to a lower value or even to 0 in the TCP/IP connection (step S3). Hence, the service provider 2 is not allowed to send any packets when the window size is 0 and the downlink traffic will thus be decreased. In step S4, the SGSN network element checks whether the conditions are getting 30 better or whether it has no large amount of data buffered anymore for the connection. If YES in step S4, the SGSN network element 3 quits changing the TCP window field and allows the mobile terminal 1 to specify a normal window size (step S6). On the other hand, if NO in step S4, the SGSN 35 network element checks whether the window size is larger than 0 (step S5), and if YES, reduces the window size again.

The TCP window size optimization according to the present invention needs to be applied to all active TCP connections for the specific mobile terminal. This, however, does not increase the complexity since the same modifying operation can be done for all these connections as they end up in the same mobile terminal.

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PCT Patent Application No.: PCT/EP99/03875
NOKIA NETWORKS OY
Our ref.: WO 23999

1. A packet data transmission network system comprising:
a receiver (1); and
a sender (2) for transmitting data packets to the receiver (1) through a packet data connection via a network element (3), the receiver being arranged to acknowledge each received data packet by an acknowledgment message containing header data comprising a window size, the number of transmitted bytes for which the sender (2) has not received an acknowledgment from the receiver (1) being not allowed to exceed the window size; wherein

characterized in that

2. The system according to claim 1, wherein said network element (3) is arranged to modify the window size to a lower value when it detects a decreasing quality of transmission conditions.

AMENDED SHEET

4. The system according to any one of claims 1 to 3, wherein the transmission conditions detected by said network element (3) comprise buffering conditions of data packets at said network element (3).

5. The system according to any one of claims 1 to 4, wherein the packet data connection is a TCP/IP connection.

6. The system according to any one of claims 1 to 6, wherein said network element (3) is an SGSN network element for performing header compression.

7. A network element (3) in a packet data transmission network system, comprising:

buffering means for buffering data packets transmitted by a sender (2) to a receiver (1) through a packet data connection, the receiver being arranged to acknowledge each received data packet by an acknowledgment message containing header data comprising a window size, the number of transmitted bytes for which the sender (2) has not received an acknowledgment from the receiver (1) being not allowed to exceed the window size; and

examining means for examining and modifying the header data;

characterized by

detecting means for detecting transmission conditions comprising radio conditions; and

modifying means for modifying the window size according to the detected transmission conditions.

8. The network element according to claim 7, wherein said modifying means is arranged to modify the window size to a lower value when said detecting means detects a decreasing quality of transmission conditions.

10. The network element according to any one of claims 7 to 9, wherein the transmission conditions detected by said detecting means comprise buffering conditions of data packets at said buffering means.

transmitting data packets from a sender (2) to a receiver (1) through a packet data connection via a network element (3), the receiver acknowledging each received data packet by an acknowledgment message containing header data comprising a window size, the number of transmitted bytes for which the sender (2) has not received an acknowledgment from the receiver (1) being not allowed to exceed the window size; and

buffering, in said network element (3), transmitted data packets and examining and modifying the header data; characterized by the step of:

detecting (S1, S2) transmission conditions comprising radio conditions and modifying (S3-S5) the window size accordingly.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
14 December 2000 (14.12.2000)

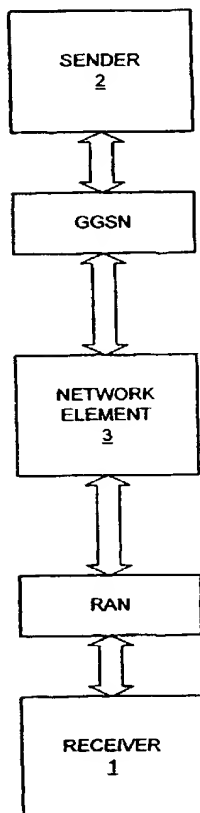
PCT

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WO 00/76139 A1

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- (71) Applicant (for all designated States except US): NOKIA NETWORKS OY [FI/FI]; Keilalahdentie 4, FIN-02150 Espoo (FI).
- (81) Designated States (national): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): BERGENWALL, Martin [FI/FI]; Heinjoenpolku 3 A 6, FIN-02140 Espoo (FI).
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[Continued on next page]

(54) Title: PACKET DATA TRANSMISSION CONTROL



(57) Abstract: A packet data transmission network system is disclosed which comprises a receiver (1), a sender (2) for transmitting data packets to the receiver (1) through a packet data connection via a network element (3). The receiver (1) acknowledges each received data packet by an acknowledgment message which contains header data comprising a window size, the number of transmitted bytes for which the sender (2) has not received an acknowledgment from the receiver (1) being not allowed to exceed the window size. The network element (3) buffers data packets transmitted by the sender (2) and examines and modifies the header data. According to the invention, the network element (3) detects transmission conditions and modifies the window size accordingly.

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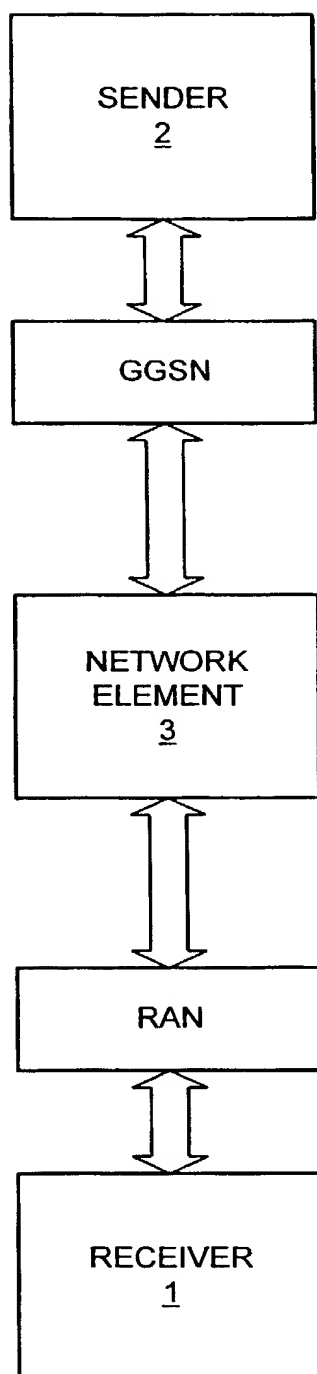


FIG. 1

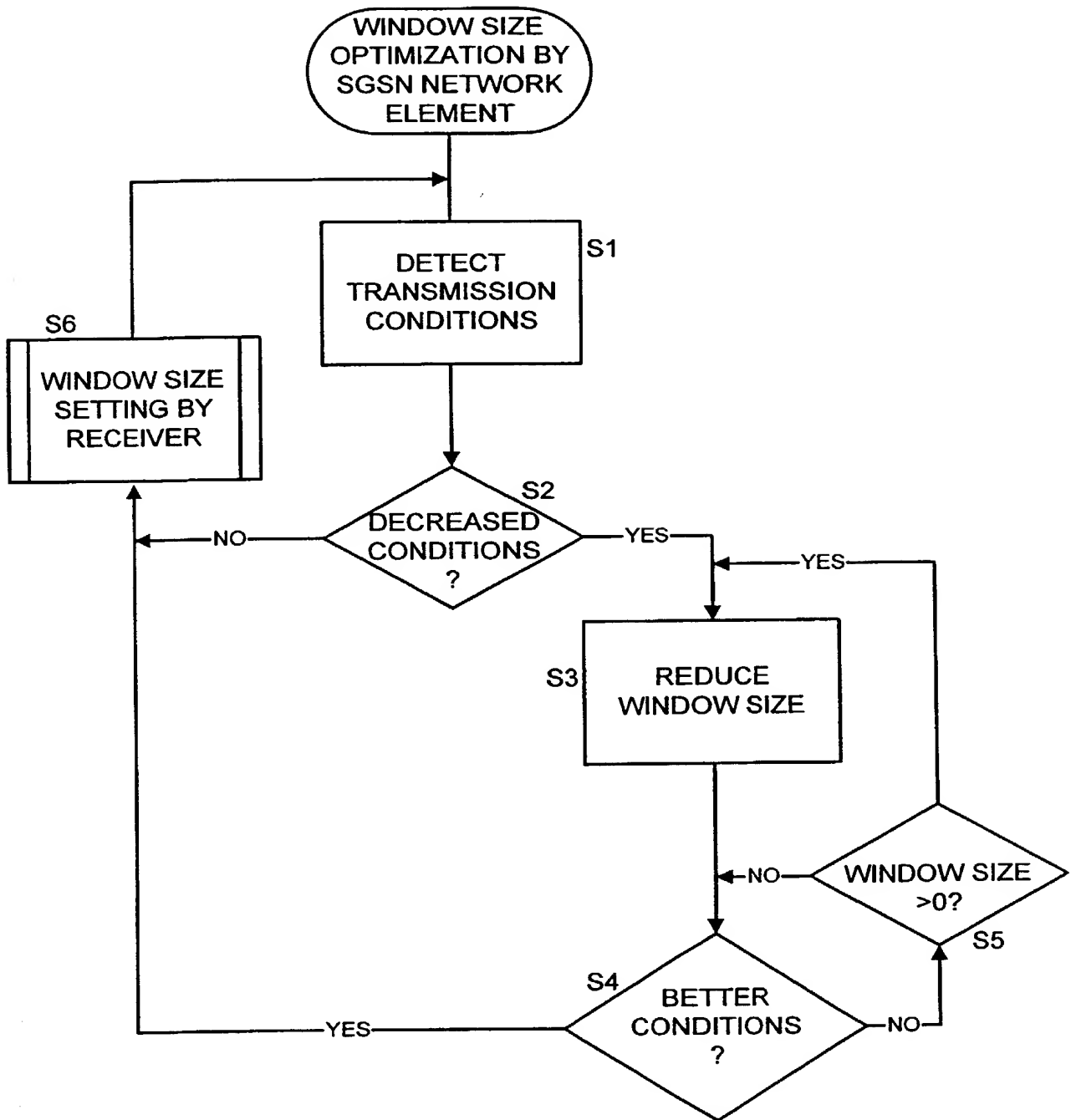


FIG. 2

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY Includes Reference to PCT International Applications			Attorney's Docket No. 4925-180PUS	
<p>As a*below named inventor, I hereby declare that:</p> <p>My residence, post office address and citizenship are as stated below next to my name.</p> <p>I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:</p> <p style="text-align: center;">PACKET DATA TRANSMISSION CONTROL</p> <p>the specification of which (check only one item below)</p> <p><input type="checkbox"/> is attached hereto</p> <p><input type="checkbox"/> was filed as United States application</p> <p>Serial No. _</p> <p>on _</p> <p>and was amended</p> <p>on _ (if applicable).</p> <p><input checked="" type="checkbox"/> was filed as PCT international application</p> <p>Number <u>PCT/EP99/03875</u></p> <p>on <u>04 June 1999</u></p> <p>and was amended under PCT Article 19</p> <p>on _ (if applicable).</p> <p>I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.</p> <p>I acknowledge the duty to disclose information which is material to the patentability of the application in accordance with Title 37, Code of Federal Regulations, §1.56(a).</p> <p>I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.</p>				
PRIOR FOREIGN/PCT APPLICATIONS AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:				
Country (if PCT, indicate "PCT")	Application Number	Date of Filing (day, month, year)	Priority Claimed Under 35 U.S.C. 119	
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
PCT	PCT/EP99/03875	04 June 1999	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO

Combined Declaration for Patent Application and Power of Attorney (Continued)
(Includes Reference to PCT International Applications)

Attorney's Docket No.
4925-180PUS

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS (check one)		
U S APPLICATION NUMBER	U S FILING DATE	PATENTED	PENDING	ABANDONED
PCT APPLICATIONS DESIGNATING THE U.S.				
PCT APPLICATION NO	PCT FILING DATE	U S SERIAL NUMBERS ASSIGNED (if any)		
PCT/EP99/03875	04 June 1999		x	

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (*List name and registration number*)

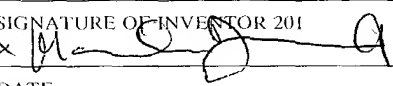
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Combined Declaration for Patent Application and Power of Attorney (Continued) (Includes Reference to PCT International Applications)				Attorney's Docket No. 4925-180PUS
2 0 3	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE / CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY
<p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.</p>				
SIGNATURE OF INVENTOR 201 x 		SIGNATURE OF INVENTOR 202		SIGNATURE OF INVENTOR 203
DATE x Dec. 13, 2001		DATE		DATE